DESCRIPTION

The MXN50P03 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -4.5V. This device is suitable for use as a Battery protection or in other Switching application.

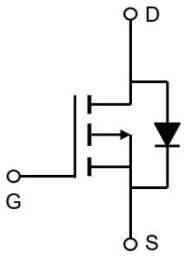
GENERAL FEATURES

- V_{DS}=-30V, I_D=-50A
  $R_{DS(ON)}$(Typ.)=14mΩ @ V_{GS}=-4.5V
  $R_{DS(ON)}$(Typ.)=9mΩ @ V_{GS}=-10V

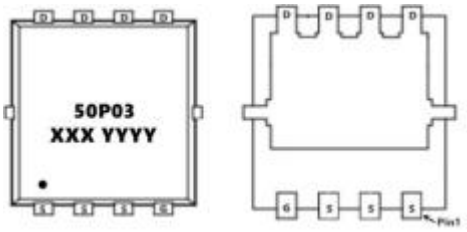
APPLICATION

- Lithium battery protection
- Wireless impact
- Mobile phone fast charging

PINOUT



Schematic diagram



Marking and pin Assignment


DFN5*6-8L top & bottom view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MXN50P03	-55°C to 150°C	DFN5*6-8L	5000

ABSOLUTE MAXIMUM RATINGS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±25	V
Drain Current-Continuous(V_{GS}=-10V, T_C=25°C)(Note1)	I_D	-50	A
Drain Current-Continuous(V_{GS}=-10V, T_C=100°C)(Note1)	I_D	-30	A
Drain Current-Continuous(V_{GS}=-10V, T_A=25°C)(Note1)	I_D	-9.6	A
Drain Current-Continuous(V_{GS}=-10V, T_A=70°C)(Note1)	I_D	-7.7	A
Pulsed Drain Current(Note2)	I_{DM}	-150	A
Single Pulse Avalanche Energy(Note3)	E_{AS}	125	mJ
Avalanche Current	I_{AS}	-50	A
Total Power Dissipation(T_C=25°C)(Note4)	P_D	45	W
Total Power Dissipation(T_A=25°C)(Note4)	P_D	2.0	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance, Junction-to-Ambient(Note1)	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Ambient(t≤10s)(Note1)	$R_{\theta JA}$	25	°C/W
Thermal Resistance, Junction-to-Case(Note1)	$R_{\theta JC}$	2.8	°C/W

Note 1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note 2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note 3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}=-50A
Note 4.The power dissipation is limited by 150°C junction temperature

ELECTRICAL CHARACTERISTICS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-30	-33	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V,V_{GS}=0V,T_J=25°C	-	-	-1	μA
		V_{DS}=-24V,V_{GS}=0V,T_J=55°C	-	-	-5	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±25V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0	-1.7	-2.5	V
Drain-Source On-State Resistance(Note2)	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-8A	-	14	20	mΩ
		V_{GS}=-10V, I_D=-12A	-	9	13	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-30A	-	30	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1.0MHz	-	2215	-	pF
Output Capacitance	C_{oss}		-	310	-	pF
Reverse Transfer Capacitance	C_{rss}		-	237	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V,F=1.0MHz	-	9	-	Ω
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, I_D=-15A, V_{GS}=-10V,R_G=3.3Ω	-	8	-	nS
Turn-on Rise Time	t_r		-	73.7	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	61.8	-	nS
Turn-Off Fall Time	t_f		-	24.4	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V, I_D=-15A, V_{GS}=-4.5V	-	22	-	nC
Gate-Source Charge	Q_{gs}		-	8.7	-	nC
Gate-Drain Charge	Q_{gd}		-	7.2	-	nC
Drain-Source Diode Characteristics						
Continuous Source Current(Note1、3)	I_S	V_G=V_D=0V, Force Current	-	-	-45	A
Pulsed Source Current(Note2、3)	I_{SM}		-	-	-150	A
Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V,I_S=-1A,T_J=25°C	-	-	-1	V
Reverse Recovery Time	trr	I_F=-15A, T_J=25°C, dI/dt=100A/μs,	-	19	-	nS
Reverse Recovery Charge	Qrr		-	9	-	nC

Note1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
Note3. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Time Waveform

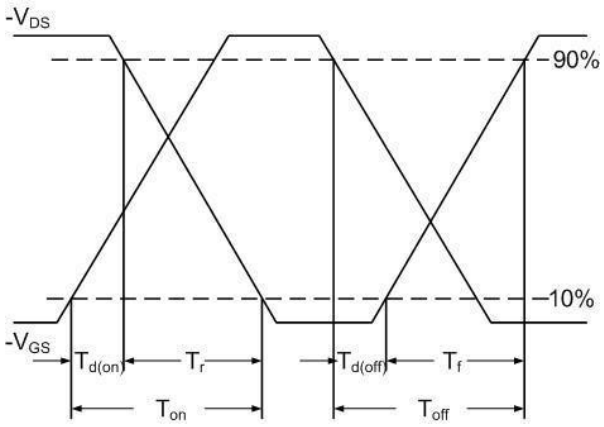


Figure 2. Unclamped Inductive Switching Waveform

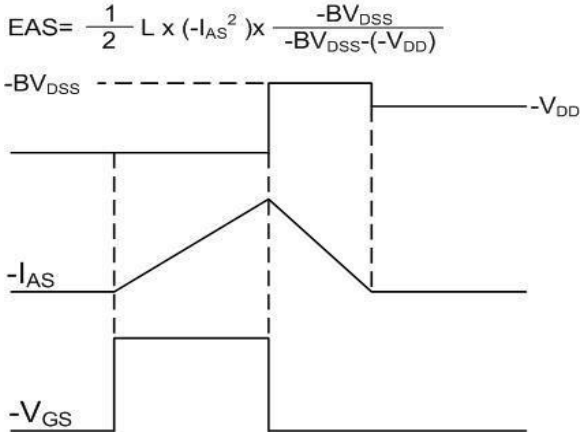


Figure 3. Output Characteristics

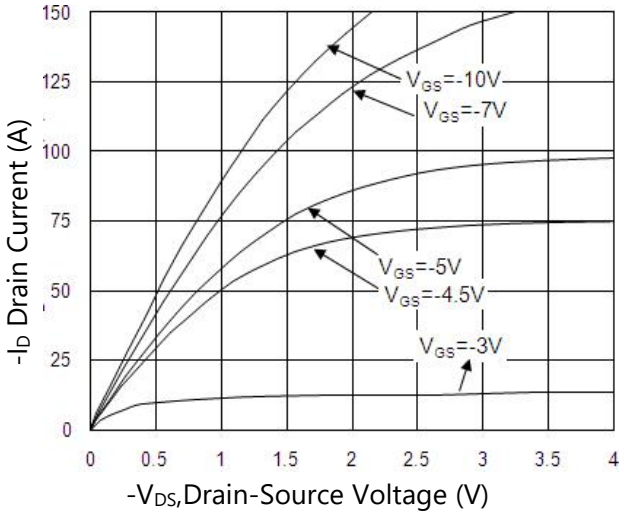


Figure 4. On-Resistance vs. V_{GS}

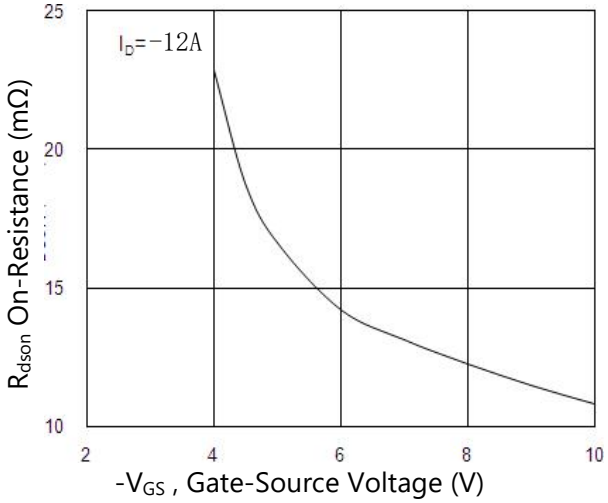


Figure 5. Forward Characteristics of Reverse

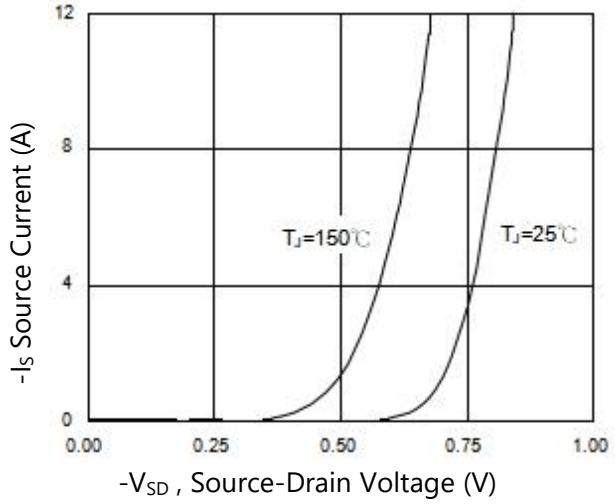
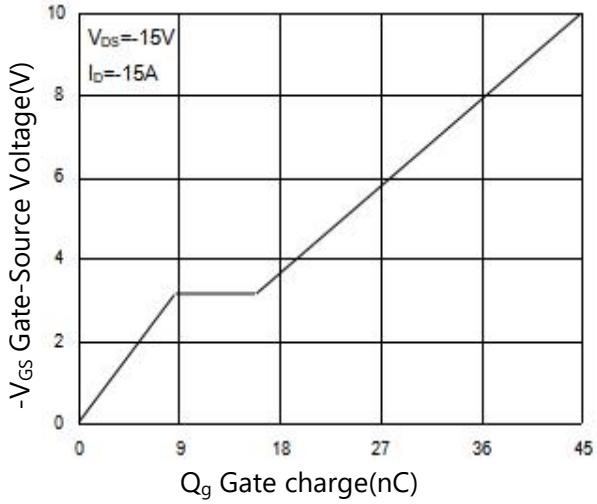


Figure 6. Gate-charge Characteristics



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. $V_{GS(th)}$ vs Junction Temperature

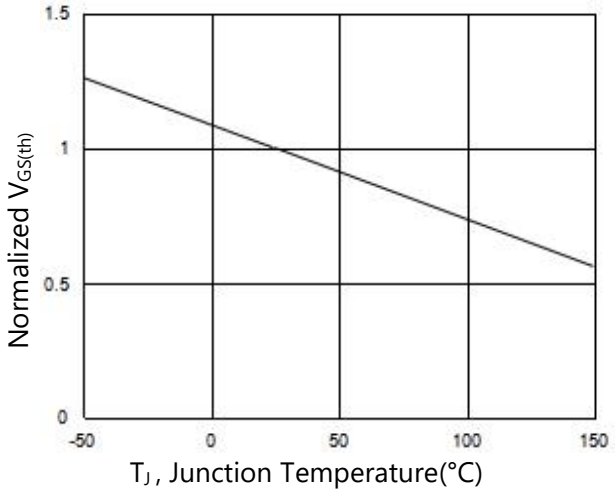


Figure 8. R_{DSON} vs Junction Temperature

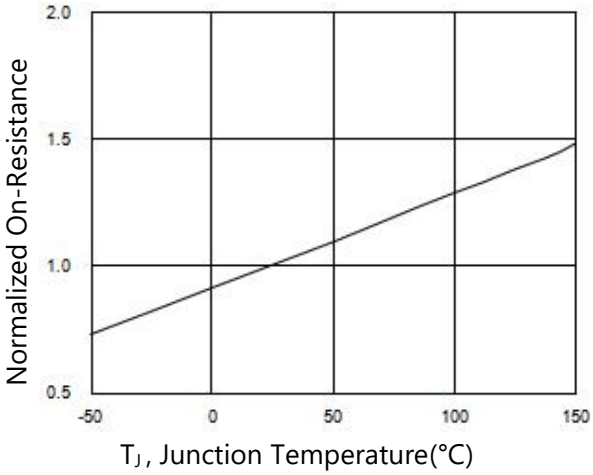


Figure 9. Capacitance vs V_{DS}

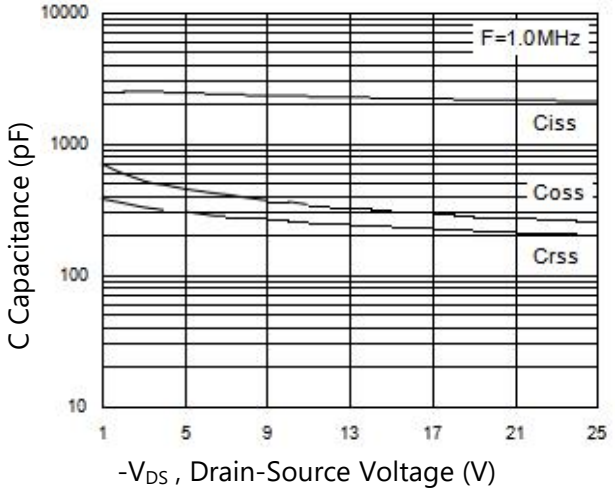


Figure 10. Safe Operating Area

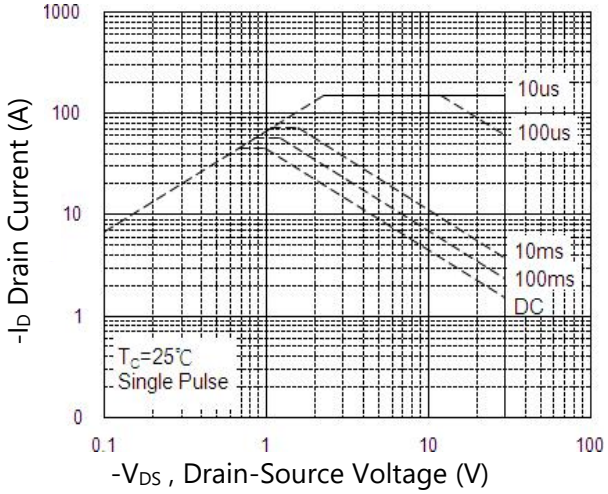
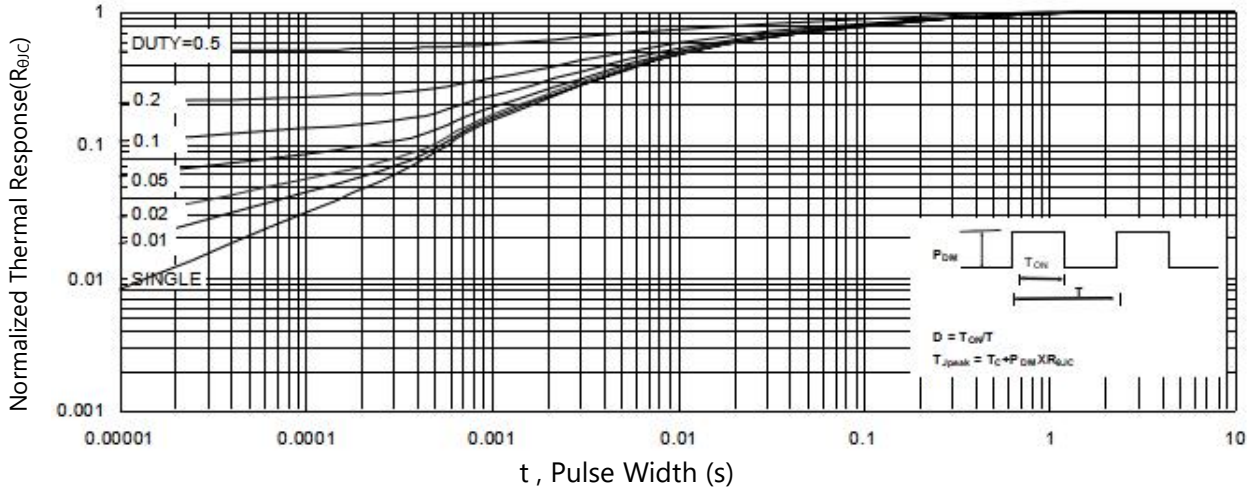
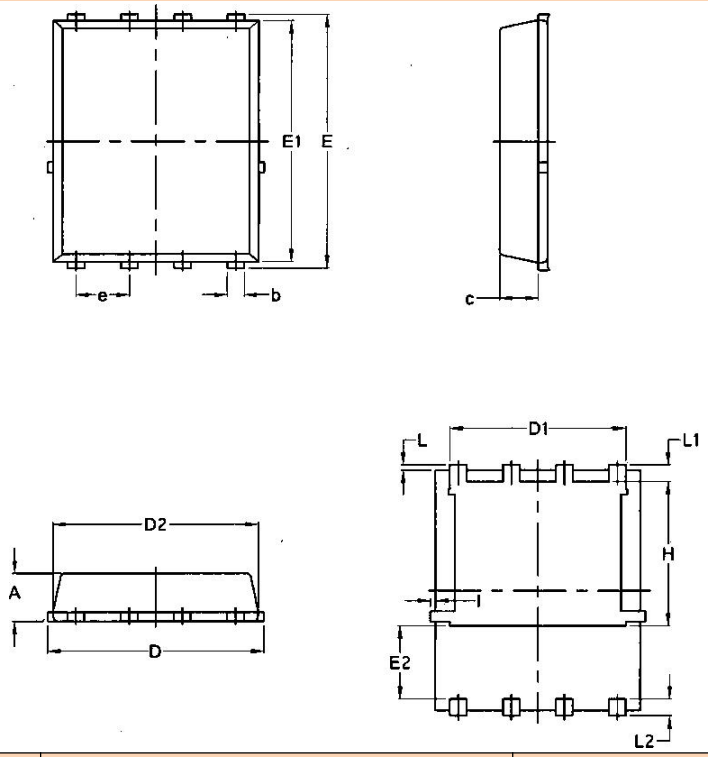


Figure 11. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070